

7. EVALUATION OF AN ALTERNATIVE SITE IN WYOMING

Consistent with the requirements of NEPA, this DEIS compares the impacts of the proposed action to the impacts of alternatives. One alternative is locating the proposed PFSF some place other than the Reservation of the Skull Valley Band of Goshute Indians. As an independent regulatory agency, the NRC does not select sites or participate with the applicant in selecting proposed sites. The NRC does not have the authority to require an applicant to submit a totally different proposal, such as building on a different site. Rather, the NRC may make one of three determinations on an application for a proposed action, namely, the NRC may: (a) grant the application (i.e., authorize the proposed action), (b) grant the application subject to certain conditions, or (c) deny the application. However, because many environmental impacts can be avoided or significantly reduced through proper site selection, the NRC examines the applicant's site selection process to ensure that adequate consideration is given to alternative sites. NRC guidance specifies that the applicant submit a slate of alternatives, and the NRC compares the proposed site to the alternatives to determine if an obviously superior alternative site has been identified (see 49 Fed. Reg. 9352, 9354, March 12, 1984).

The proposed action under consideration in this DEIS (see Sections 1.2 and 1.5) applies to Site A at the Skull Valley location. As discussed in Section 2.2.3.1, PFS's site selection process identified a site in Fremont County, Wyoming, as a candidate site for the proposed PFSF. While the Wyoming site is not being actively considered by PFS for the siting of an SNF storage facility, it is nevertheless appropriate for use in this DEIS for comparison purposes. The Wyoming site is evaluated only to determine if it is obviously superior to the Skull Valley site selected by PFS (i.e., Site A). In this chapter, the potential environmental impacts of constructing and operating the proposed PFSF at the Wyoming site are compared to those of the Skull Valley site. While the level of information on the Wyoming site is less detailed than that for the Skull Valley site, it is sufficient to reasonably characterize how the impacts from the proposed PFSF would likely differ if it were sited in Wyoming instead of Skull Valley. The comparative analysis is also intended to assist in more accurately gauging the extent, magnitude or degree of any potential environmental impacts that may be associated with the Skull Valley location.

7.1 Site Selection Process

From April through June 1996, PFS began the process for selecting a site for an ISFSI. Initially, PFS began evaluating 38 separate potential sites (see Table 7.1). Twenty-six of these sites, including the Skull Valley site, were derived from the NWN's list of sites identified by those jurisdictions that had expressed an interest in hosting the MRS. Some of the jurisdictions controlling these sites also expressed an interest in hosting the PFSF. The other 12 sites were identified from entities that contacted PFS and requested that each of those sites be considered as a possible site. The four phases of the process for evaluating the candidate sites are described in PFS's ER (see Chapter 8 in PFS/ER 2000) and are summarized below.

During the first phase of PFS's site selection process, the PFS Board of Managers conducted an initial screening on all potential sites brought to their attention in order to eliminate candidate sites that were burdened by obvious disqualifying factors. These factors included:

Table 7.1. Potential host sites considered for the proposed PFSF

No.	Potential host site	No.	Potential host site
01	Mescalero Reservation (Lower Three Rivers Site); New Mexico	20	Northern Arapaho; Wyoming
02	Mescalero Reservation (Ranch House Site); New Mexico	21	Ponca Tribe; Oklahoma
03	Goshute Tribe; Skull Valley, Utah	22	Prairie Island Sioux; Minnesota
04	Santee Sioux; Knox County, Nebraska	23	Sac & Fox Nation; Oklahoma
05	Absinnee Shawnee; Oklahoma	24	San Juan County; Utah
06	Akhoik Kaguyak Tribe; Arkansas	25	Tetlin Indian Reservation; Tetlin, Alaska
07	Alabama-Quassarte Tribe (Creek); Oklahoma	26	Tonkawa Tribe; Oklahoma
08	Apache County; Arizona	27	Ute Tribe; Colorado
09	Apache Development Authority; Oklahoma	28	Yakima Indian Nation; Washington
10	NEW Corporation; Fremont County, Wyoming	29	City of Caliente & Lincoln County; Nevada
11	United Nuclear Corporation; New Mexico	30	U.S. Fuel and Security Service Group Pacific Atoll (Palmyra Island); U.S. Protectorate
12	Caddo Tribe; Oklahoma	31	Barnwell; South Carolina
13	Chickasaw Nation; Oklahoma	32	Hanford; Richland, Washington
14	Eastern Shawnee; Oklahoma	33	Fort Wingate Army Depot; Gallup, New Mexico
15	Fifield Development Corp.; Fifield, Wisconsin	34	Atomic Energy of Canada Limited, Whiteshell Laboratories; Manitoba, Canada
16	Fort McDermitt Paiute Shoshone Tribe; Oregon	35	TGM, Inc.; White Sands, New Mexico
17	Grant County; North Dakota	36	Area 25, Nuclear Test Site; Nevada
18	Lower Brule Sioux; South Dakota	37	LADO Ranch; west Texas
19	Miami Tribe; Oklahoma	38	Andrews County; west Texas

Source: Table 8.1-1, PFS/ER 2000

- Willing host jurisdiction. The jurisdiction should be willing to host an ISFSI. 1
- Public acceptance. Local community attitudes should appear to be open to the siting of an ISFSI. 2
- Favorable proximity to transportation access. The proposed site should be within reasonable proximity of transportation infrastructure. 3
- No jurisdictional restrictions. The jurisdiction of the proposed site must have no statutes or other legal restrictions that would prohibit the siting on an ISFSI. This criterion was used as an exclusion factor. 4

Applying the Phase 1 criteria, PFS eliminated 20 of the 38 sites. Nine jurisdictions that originally participated in the MRS siting process had declined or did not pursue DOE's funding to continue with the MRS process so the sites under their control were eliminated from further consideration. Four other sites were also eliminated based on an unwilling jurisdiction. The controlling entity of two of these sites participated in the MRS process, but subsequent to their participation in the MRS process, indicated that they were not willing to host an SNF storage facility. The other two sites (i.e., under the control of the Mescalero Apache tribe) were eliminated from further consideration because of an unsuccessful attempt by PFS to reach agreements with the controlling entity about the siting of an ISFSI. Finally, seven sites were eliminated because DOE declined to fund further study and evaluation of them as potential MRS sites. As a result of DOE's denial of funding to these sites, PFS did not believe further evaluations of these sites were warranted.

The objective of the second phase of PFS's site-selection process was to identify sites for further in-depth study and analysis. To achieve this objective, PFS performed further screening of the potential sites in the second phase by using the following criteria:

- Site availability. The proposed site should have one or more areas of suitable size available for acquisition. 26
- Site development cost. The proposed site should have one or more areas that could be developed at a reasonable cost. 27
- Flood plains. The proposed site should have areas of suitable size located outside of flood plains [as defined in 10 CFR 72.122(b)(2)]. This criterion was used as an exclusion factor. 28
- Geology. The proposed site should have stable geological conditions [as defined in 10 CFR 72.102(e)]. This criterion was used as an exclusion factor. 29
- Seismology. The proposed site should not be within the range of strong near-field ground motion from historical earthquakes on large known capable faults [as defined in 10 CFR 72.102(e)]. This criterion was used as an exclusion factor. 30
- Demography. The proposed site should be in an area of low population density. 31
- Environmental consideration. The proposed site should have areas of suitable size that would not significantly impact threatened or endangered species, wetlands, historical or archaeological resources, or major recreational areas. This criterion was used as an exclusion factor. 32

As part of the second phase, the PFS Board of Managers held a meeting on May 22, 1996, to select the sites that would be recommended for the third phase of the site-selection process. At the meeting, the PFS Board members were provided with: (1) an information sheet for all 38 sites that tabulated responses to a series of questions that were based upon the Phase 1 and 2 screening criteria (see Appendix F) (information was provided for the twenty sites eliminated in Phase 1, although they were not considered in detail at the meeting), and (2) written evaluations of the sites

for which the most detailed information was available, which included background information and identified the advantages and disadvantages of each site.

Although 18 of the 38 sites remained after the Phase 1 screening process, the PFS Board of Managers focused the meeting on the eight sites that were furthest along by virtue of information provided by the potential hosts. The eight sites included: (1) Santee Sioux; Knox County, Nebraska, (2) City of Caliente and Lincoln County, Nevada, (3) Goshute Tribe; Skull Valley, Utah, (4) Barnwell, South Carolina, (5) Hanford; Richland, Washington, (6) NEW Corporation; Fremont County, Wyoming, (7) U.S. Fuel and Security Services Group; Pacific Atoll (Palmyra Island), U.S. protectorate, and (8) United Nuclear Corporation; New Mexico.

Other potential sites were also discussed, but were generally deemed not to provide any greater potential for a satisfactory site than those already discussed. Thus, ten of the remaining 18 sites were eliminated. The discussion covered background information, as well as the various advantages and disadvantages of each site. The PFS Board of Managers identified four of the eight remaining sites as warranting further detailed evaluation. The four sites were: (1) City of Caliente and Lincoln County, Nevada, (2) Goshute Tribe; Skull Valley, Utah, (3) NEW Corporation; Fremont County, Wyoming, and (4) United Nuclear Corporation; New Mexico. Subsequent to the identification of these four sites, the host jurisdiction for the City of Caliente and Lincoln County, Nevada, decided not to participate in the additional studies. Thus, only three sites were left for further consideration.

The purpose of the third phase of the PFS site-selection process was to identify at least two candidate siting areas that would likely meet NRC's licensing regulations and not be unreasonably expensive to develop. The evaluation process used in this phase involved two steps. First, a "Site Selection Questionnaire," containing a list of detailed questions intended to determine the suitability of the site, was sent to the owners or promoters of the remaining three candidate sites. Second, a major engineering firm familiar with nuclear construction was engaged to conduct a field evaluation for each of the remaining three candidate sites. A set of judgment criteria (i.e., requirements, exclusion factors, avoidance factors, and preference factors) pegged to the detailed questionnaire was developed for the subsequent evaluation and selection of a final candidate site.

Responses to the site selection questionnaire were received from the controlling entity of each site by mid-June 1996 (see Appendix F). The engineering firm prepared an evaluation matrix for the three sites using the responses to the questionnaire and the field investigations. This evaluation concluded that the United Nuclear Corporation, New Mexico, site did not appear to offer sufficient contiguous land areas suitable for siting an ISFSI of the size anticipated for this project. This site was therefore eliminated from further consideration. The two remaining sites were the Skull Valley site and the New Corporation site in Fremont County, Wyoming.

In Phase 4, the remaining two sites were subjected to field investigations to further their technical and licensing viability. Three primary categories were used for the field investigations: environmental, technical, and permitting requirements. Environmental criteria included land use, demographics, cultural factors, ecological factors, hydrology, hazards, meteorological factors, visual impact, and auditory impact. Technical criteria included geologic factors, topography, drainage, siting, flexibility, cost, and accessibility. The final category included permits required for wetlands, dredge/fill operations, Endangered Species Act compliance, and building. The results of the field investigation were formally documented in a report to PFS in August 1996 (Stone & Webster 1996).

The field investigation concluded that the two remaining sites ranked very closely to each other on the overall technical evaluation criteria and that both sites were suitable for development of a SNF storage facility. The Wyoming site was found to rank slightly higher, based on the point system developed by the engineering firm. Based on the findings of the technical and environmental evaluations, the PFS Board of Managers authorized negotiations with the owners of both sites. As a result of this process, the Skull Valley site was ultimately chosen over the Wyoming site by PFS based upon (a) a more favorable lease or purchase arrangement with the land owners, (b) greater distance to population centers, (c) the promoter of the Wyoming site possessing only an option to purchase the site, (d) uncertainties associated with the required legislative approval for the Wyoming site, and (e) a favorable vote by the Skull Valley Band's tribal council to proceed with the project.

The PFS site-selection process has structure and appears practicable. The approach of using the NWN sites, as well as others that expressed an interest in hosting the PFSF, as the set of sites considered appears to be a reasonable. Specific weighting and ranking factors were not developed by PFS Board of Managers, therefore, it is difficult to ascertain specifically how the PFS Board of Managers evaluated and selected the four candidate sites. However, based on the information provided on these four sites, the Board of Managers did have objective information that would allow them to make a reasoned decision among the alternative sites. Once the candidate sites were selected, PFS did perform site investigations and evaluated the sites using specific technical and environmental criteria. Weighting factors were used to rank the sites.

7.2 Characteristics of the Wyoming Site

The alternative site in Wyoming is located north of Shoshoni, Wyoming, about 39 km (24 miles) northeast of Riverton and about 16 km (10 miles) southeast of the Owl Creek Mountains (see Figures 7.1 and 7.2). It is also about 9 km (6 miles) east of the Wind River Indian Reservation. The siting area is located on privately-owned land that is currently used for the seasonal grazing of livestock. The siting area offers locations of sufficient size to support the minimum needs of the facility. A Burlington Northern Santa Fe Railway line runs adjacent to the site. The layout of the facility and its design would be similar to that described in Section 2.1.1.2 for the proposed PFSF in Skull Valley. One significant difference between the proposed site in Skull Valley and the alternative site in Wyoming is that the Wyoming site is located adjacent to an existing railroad and would require approximately 1.6 km (1 mile) of new rail construction for access.

Water well records obtained from the State of Wyoming in 1996 indicate the presence of domestic wells approximately 1,380 m (4,500 ft) southwest and 1,380 m (4,500 ft) northwest from the center of the Wyoming site. Residences exist at each of these well locations. Thus, the nearest resident(s) in Wyoming would be closer than in Skull Valley. Both the towns of Shoshoni and Bonneville are within 3.2 km (2 miles) of the Wyoming site. In 1990, the population of Shoshoni was 497. PFS estimates that the population of Bonneville is 60 (PFS/RAI2 1999).

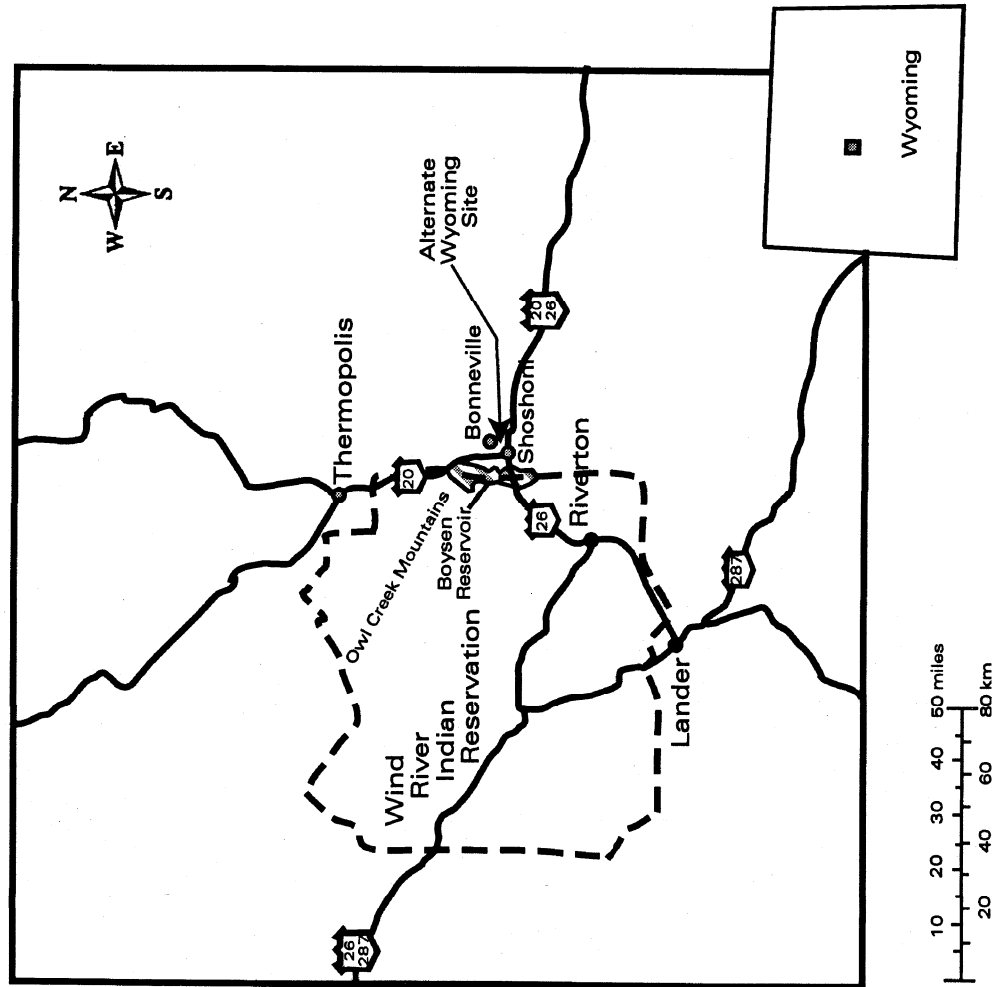


Figure 7.1. Possible location of an alternative spent fuel storage facility in Wyoming.

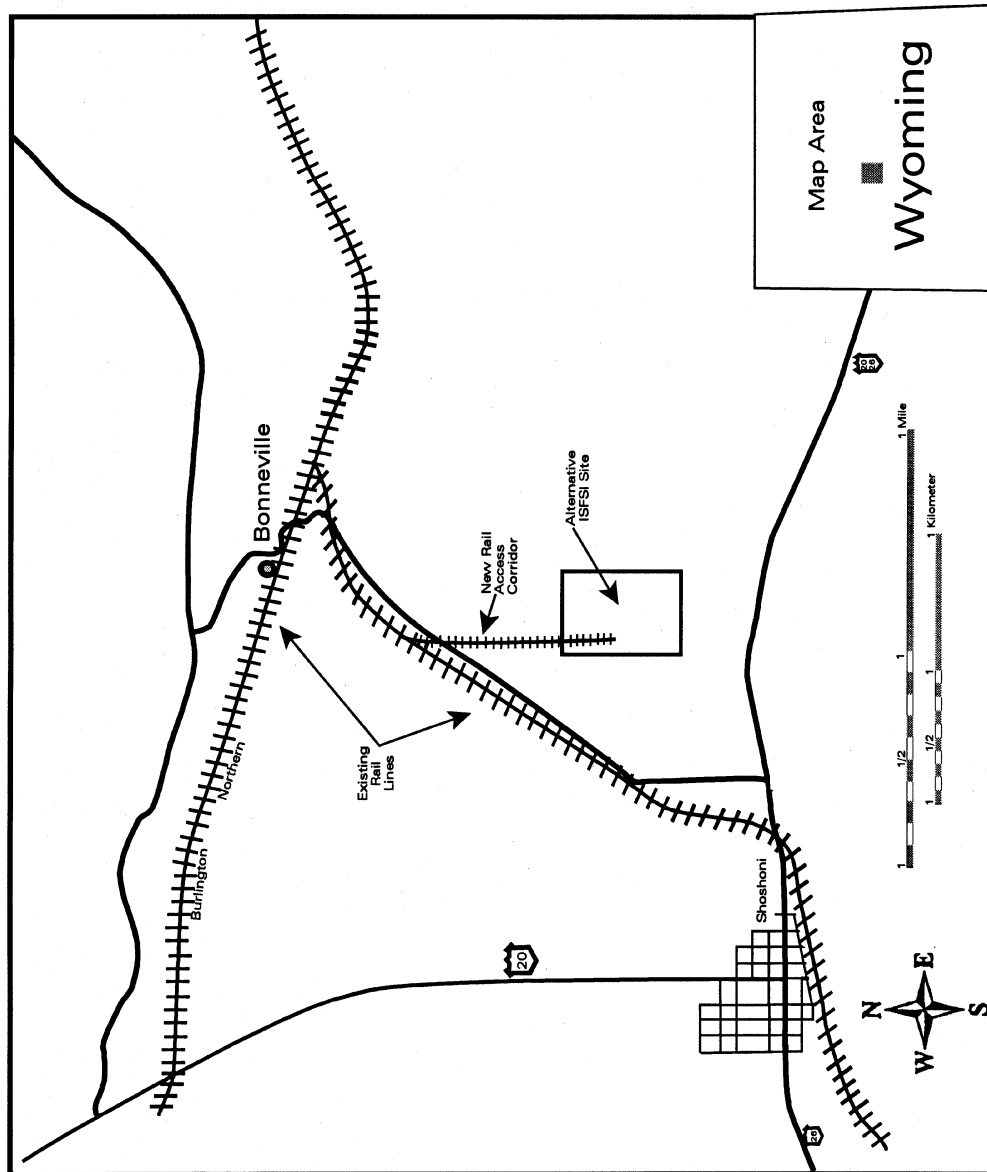


Figure 7.2. Possible site for a spent fuel storage facility near Shoshoni, Wyoming.

7.3 Impacts of Constructing and Operating an SNF Storage Facility at the Wyoming Site

As discussed in Section 2.2.3.1, PFS has identified an alternative site in Wyoming for their SNF storage facility. The evaluation of potential environmental impacts at this Wyoming location has been conducted for comparison to the impacts described in Chapter 4 for an SNF storage facility at Site A in Skull Valley, Utah. The discussions below present the relevant aspects and characteristics of the environmental setting in Wyoming in sufficient detail to have an understanding of how construction and operation of the proposed PFSF might impact the Wyoming site as compared to how it could impact Skull Valley. Table 7.11, discussed further in Section 7.6, provides a resource by resource summary comparison of the impacts at the two sites.

It is not the intent of the following sections to definitively describe the magnitude, extent or degree of the potential impacts of construction and operation of an ISFSI in Wyoming. Instead, the characteristics of the Wyoming site are compared to those in Skull Valley to better evaluate the impacts associated with the use of the Skull Valley site.

7.3.1 Geology, Minerals, and Soils

Like the preferred site, environmental impacts to soils at the Wyoming site include loss of the soils resource because of physical alterations to the existing soil profile. Similarly, impacts would occur to economic geologic resources (e.g., aggregate) from their use as construction materials and from possible access restrictions to minerals beneath the site. PFS has indicated that sufficient quantities of aggregate material would be available. The closest sources of aggregate would be approximately 42 to 45 km (26 to 28 miles) south of Riverton, Wyoming. The widely available sandstone bedrock in the region could also be mechanically crushed for such use. Because mineral resources (coal) are widely available and more economically obtained elsewhere in the area, impacts from the unavailability of any coal beneath the site would be small. The seismic characteristics at the Wyoming site are also compared to those at the preferred site and are found to be similar.

USDA (1993) reports that soils at the Wyoming site are shallow [about 45 cm (18 inches)] and well drained. Hazards of water and wind erosion are severe and moderate, respectively. Use of the soils for roadfill, sand, or gravel construction materials is poor to improbable due to excess fines. Topsoil quality is poor due to the presence of small stones. The ability for water to move downward through the saturated soils is slow (0.2 to 0.6 inch/hr), and pH varies between 7.9 and 9.0. Shrink-swell potential is moderate (between 3 and 6 percent). These soil characteristics are similar to those at the preferred site in Skull Valley (see Section 3.1).

Earthquakes pose a geologic hazard at the Wyoming site as they do at the proposed Skull Valley site (see Section 3.1). Case (1999) describes the presence of the east-west trending Stagner Creek Fault system located north of the town of Shoshoni and about 13 km (8 miles) north of the Wyoming site. This fault is considered to be a capable fault as described in 10 CFR Part 100, Appendix A. The fault is considered to have the potential for causing a magnitude 6.75 earthquake, which is slightly less than the mean 7.0 magnitude estimate for the Stansbury Fault near the proposed Skull Valley site. Because the earthquake magnitude for the fault system near the Wyoming site is only slightly lower than the Stansbury Fault near the Skull Valley site, the seismic characteristics of the Wyoming site are similar to the Skull Valley site.

The Wyoming site is located in the Wind River Coal Basin, which contains thin layers of sub-bituminous coal. PFS reports (PFS/RAI2 1999) that the basin is mined along its edges where the coal is at or near the ground surface, and the closest exposure of coal-bearing rocks is roughly 13 km (8 miles) north of the site. Coal may be present at some unknown depth beneath the Wyoming site, but mining of that resource is unlikely due to more economically available coal located near the surface.

Oil and gas reserves are also present in the Wind River Basin. A small abandoned gas field is located about 8 km (5 miles) east of the Wyoming site, and two exploratory wildcat wells are located about 1.2 km (0.75 mile) northwest of the site. The site area is included within the productive limit of the Fort Union Formation gas play, and the potential for exploration in the future is unknown. Mineral production in the site area is limited to a small uranium prospect located about 4 km (2.5 miles) northwest of the Wyoming site and a feldspar processing plant located just north of the site, where trona is currently processed and shipped.

7.3.2 Water Resources

Surface water. The Wyoming site is in the central part of the State where annual precipitation is approximately 25 cm (10 inches). The site lies on upland terrain between two ephemeral stream valleys. No perennial surface water features exist on site, and area drainage is to the ephemeral streams that ultimately feed into Boysen Reservoir. Although detailed analyses of site flooding potential have not been performed, flooding does not appear to be a concern at the Wyoming site because the site lies in an upland area.

Groundwater. The Wyoming site lies in the Wind River Basin in Central Wyoming. Groundwater occurs in coarse sand beds in the Wind River Formation, and most local wells are drilled to depths of 90 to 120 m (300 to 400 ft) to ensure adequate year-round water supply. Water quality is good at the depths of typical wells. The closest well to the site is located approximately 1,370 m (4,500 ft) from the site. Water quality and availability appear to be adequate to meet the ISFSI site construction and operational needs.

7.3.3 Air Quality

The area within 100 km (62 miles) of the alternative site in Wyoming is in attainment of all NAAQS. There is no *a priori* reason to believe that effects on air quality from construction and operation of an ISFSI at the Wyoming site would be appreciably different than at the proposed Skull Valley location. The most important factor in a more precise determination of the potential air quality impacts would be the location of the site with respect to its proximity to residences or other places likely to be frequented by members of the general public. Available information suggests that the nearest residences to the Wyoming site are about 1,400 m (4,500 ft) away. At that distance, impacts of construction activities would be expected to be appreciably greater than the impacts to the nearest residents at the proposed site in Skull Valley, who are 3.2 km (2 miles) away from the preferred Site A in Skull Valley.

7.3.4 Ecological Resources

Impacts to ecological resources for the alternative site in Wyoming would be similar to those for the proposed PFSF site in Skull Valley and are expected to be small.

Vegetation. The potential impacts on vegetation for an ISFSI located near Shoshoni, Wyoming, would be very similar to those associated with a facility located in Skull Valley, Utah. The Wyoming site is located in the desert and basin vegetation zone of Wyoming which has an elevational range of about 1,200 to 1,800 m (4,000 to 6,000 ft) and a xerophytic flora (Porter 1962). This intermountain basin area of Wyoming contains a mosaic of shrublands including desert shrublands (Knight 1994). The specific ecoregion that the site is located in is variously identified as the Sagebrush-Wheatgrass section of the Wyoming Basin Province [covering an area of approximately 75,600 km² (29,200 miles²)] (Bailey 1980) or as the boundary of the sagebrush steppe and wheatgrass-needlegrass shrub steppe (Küchler 1964). These ecoregions consist of open to dense grasslands that include open to somewhat dense scatterings of shrubs. The primary vegetation within these regions is sagebrush or shadscale with a mixture of short grasses. Moist alkaline flats in this region support greasewood which is alkali-tolerant.

The useable area of the Wyoming site is mainly flat to gently sloping and is largely rangeland too arid to economically graze livestock (Gillespie et al. 1996; Stuart and Anderson 1998). On the site itself, the dominant vegetation in July was observed as short grasses with some shrubs, cacti, yucca, and vetches (Gillespie et al. 1996). No unique habitats are found in the vicinity (Stone & Webster 1996a). The Wyoming site could encompass about 1,093 ha (2,700 acres) (Stuart and Anderson 1998). The expected land area needed for storage area in Wyoming is assumed to be the same as in Skull Valley [i.e., 40 ha (99 acres)]. This area is less than 4 percent of the site area available in Wyoming.

Wildlife. The only specific sources of information concerning the wildlife at the Wyoming site is a Field Investigation Evaluation Report from 1996 (Stone & Webster 1996a) and a letter from the Wyoming Natural Diversity Database (Smith 1999). Information from older projects in the general area in which the site is located (e.g., NRC 1980a, 1980b; DOE 1985) indicates that the fauna are generally typical of desert scrub grassland communities of the intermountain region. The most common predators in the area are the coyote (*Canis latrans*) and badger (*Taxidea taxus*), which feed heavily on rodents and ground squirrels. Coyotes are also important predators of desert cottontails (*Sylvilagus audubonii*) and white-tailed jackrabbits (*Lepus townsendi*). Rodents are the most abundant small mammals in the area, and include such species as deer mice (*Peromyscus maniculatus*), northern grasshopper mice (*Onychomys leucogaster*), least chipmunk (*Butamias minimus*), and Richardson's ground squirrel (*Spermophilus richardsoni*). Large mammals that are likely to be present include mule deer, pronghorn antelope, and feral horses. Birds representative of sagebrush-grasslands and foothill scrub communities include such nesting passerine species as the horned lark (*Eremophila alpestris*), Brewer's sparrow (*Spizella brewerii*), sage thrasher (*Oreoscoptes montanus*), and the mountain bluebird (*Sialia currocoides*). Game birds such as sage grouse and mourning dove (*Zenaidura macroura*) are also likely to be present, as would raptor species such as kestrels, red-tailed hawk, and the ferruginous hawk.

Based on the available information, it appears that wildlife species composition at the Wyoming site is similar to that at the Skull Valley site. Thus, the impacts to wildlife at the two sites are expected to be similar and would be small.

Perennial and ephemeral streams. Impacts on streams would be small. Two ephemeral streams are located near the Wyoming site: Badwater Creek and Poison Creek. Drainage at the site is mainly subsurface except during infrequent local rain storms (Stone & Webster 1996a). Two or three dry washes occur within 1.6 km (1 mile) of the site. There is no aquatic habitat on or near the proposed Wyoming site; thus, there would be no impact to aquatic biota or perennial streams, as is also the case in Skull Valley.

Wetlands. Impacts on wetlands would be small. One area in the northern part of the site is classified as a wetland and would be avoided during construction (Stuart and Anderson 1998). Assuming that PFS would use BMPs similar to those proposed for Skull Valley, during construction, erosion would be effectively controlled in that area. Only if groundwater that is necessary to support this wetland were withdrawn for use by the project, would there be potential negative impacts.

Threatened, endangered, and other species of special concern. Table 7.2 lists species of special concern identified within the township under consideration for the Wyoming alternative site or within a one-township buffer zone around that site (i.e., a total of nine townships) (Smith 1999).

Neither of the two plant species in that table are State or Federally listed. Both species were candidates for Federal listing in the past, but not enough information was available to determine if listing was appropriate. As of 1993, Owl Creek miner's candle (*Cryptantha subcapitata*) was considered to be declining, while the trend for persistent sepal yellowcress (*Rorippa calycina*) was unknown (58 Fed. Reg. 51143, Sept. 30, 1993).

Owl Creek miner's candle is a mat-forming perennial herb with white flowers that grows 5–15 cm (2–6 inches) high (Fertig 1994). The habitat for this species consists of sandy-gravelly slopes and desert ridges in sparsely vegetated cushion plant communities. The plants are potentially threatened by surface-disturbing activities. The entire distribution of this species is in the Owl Creek Mountains around Boysen Reservoir (Smith 1999), which is about 8 km (5 miles) from this alternative site. Two of the known four occurrences are located in the nine-township area around the alternative site. Persistent sepal yellowcress, a member of the mustard family, is a rhizomatous, perennial herb with small yellow flowers (Fertig 1994). It is a regional endemic found along mudflats around reservoirs (Smith 1999) and, is therefore, unlikely to be present on this alternative site.

Whether either of these plant species occurs within the area that would be disturbed for a facility located at this site is unknown. Before this site would be used, surveys of potential habitat for these species would be necessary, and appropriate actions to mitigate effects on these species would be considered.

The Field Investigation Evaluation Report documents that no surveys for rare or endangered species have been conducted on the site. In addition, according to the State of Wyoming, no endangered or threatened species use the Wyoming site. There is one record of the State-listed common loon (*Gavia immer*) on Boysen Reservoir, a few miles to the west of the site. Because no habitat exists on the proposed site for loons, no impacts to this species would be expected. There is also no record of any endangered or threatened species being present at the Wyoming site. The ferruginous hawk, a State-listed species in Wyoming, is reported to use the Wyoming site (Stone & Webster 1996a). This is in contrast to Skull Valley where the State endangered peregrine falcon and the State threatened

Table 7.2. Occurrences of species of concern in Fremont County, Wyoming, T38N R94W S23, and buffer zone^a

Scientific name	Common name	Federal status (animals) or management status (plants)	Global rank/State rank	Wyoming Game and Fish status (animals)	Number of occurrences in area
Birds					
<i>Gavia immer</i>	Common Loon	S-USFS R2 S-USFS R4	G5/S2B, SZN	WYGF-SSC1	1
<i>Buteo regalis</i>	Ferruginous Hawk	N/A	N/A	SS	N/A
Plants					
<i>Cryptantha subcapitata</i>	Owl Creek Miner's Candle		G2/S2		2
<i>Rorippa calycina</i>	Persistent Sepal Yellowcress		G3/S2S3		5

^aS-USFS R2 = designated sensitive, U.S. Forest Service, Region 2; S-USFS R4 = designated sensitive, U.S. Forest Service, Region 4; Wyoming Game and Fish Status—SSC1 = species with on-going significant habitat loss, populations greatly restricted or declining, and extirpation appears possible; "G" Rank: G1 = Extremely rare, only 1 to 5 populations known throughout the world. May be critically imperiled; G2 = Very rare, between 6 and 20 known populations world-wide. May be imperiled; G3 = Rare, between 21 and 100 known populations worldwide; G4 = Apparently secure globally, over 100 populations, although it may be quite rare in portions of its range, especially on the periphery; G5 = Secure under present conditions; "S" Rank: State Ranks are preceded by an "S" and also range from 1 to 5, as above, with 1 being the rarest (only 1 to 5 populations within the State) and 5 being the most common (secure within the State); State Ranks have been augmented for migratory animals, primarily birds: A "B" following a State Rank will indicate the breeding status of the species within the State: Breeding Ranks range from 1 to 5, as above; "SZN" indicates species which are not of significant status when migrating through or wintering in Wyoming. Includes uncommon migrants of interest, as well as (1) rare species for which important habitats could be protected, but are difficult or impossible to define, and (2) abundant species wintering in or migrating through Wyoming. SS = Wyoming State sensitive.

Source: Letter dated November 19, 1999, from Rebekah Smith, Wyoming Natural Diversity Database to Susan Davis, Stone and Webster.

ferruginous hawk may use the proposed PFSF area, as well as a number of other species of concern as listed by the State of Utah and BLM

7.3.5 Socioeconomic and Community Resources

The Wyoming site is located in a remote, sparsely populated area (see Table 7.3), and direct and indirect impacts to socioeconomic and community resources should be qualitatively and quantitatively similar to those at the remote, sparsely populated Skull Valley site. The only potentially significant difference in impacts to socioeconomic and community resources between the Wyoming site and the proposed Skull Valley site would be a function of different construction and operating requirements associated with the local transportation option. As noted in Section 7.2, the Burlington Northern Railroad rail line runs adjacent to the Wyoming site. This would obviate the need to construct a lengthy rail line connecting the main line with a SNF storage facility or require over-the-road heavy-haul shipments of the SNF canisters. This would eliminate or substantially reduce the

Table 7.3. Population in Fremont County and incorporated areas

	1990	Estimated population				
		7/1/94	7/1/95	7/1/96	7/1/97	7/1/98
Wyoming	453,588	474,894	478,364	480,060	480,043	480,907
Fremont County	33,662	35,080	35,607	35,851	35,959	36,044
Dubois town	878	960	1,000	1,015	1,024	1,034
Hudson town	389	404	410	410	413	412
Lander city	7,023	7,178	7,283	7,340	7,360	7,378
Pavillion town	103	129	131	134	136	140
Riverton city	9,202	9,794	9,957	10,061	10,100	10,126
Shoshoni town	497	512	519	521	524	527
Balance of Fremont County	15,570	16,103	16,307	16,370	16,402	16,427

Sources: U.S. Bureau of the Census, 1990 and U.S. Bureau of the Census, 1999.

adverse traffic impacts, as well as the favorable economic impacts to the Skull Valley Band, associated with local transportation identified for the Skull Valley site (see Section 5.5).

Operational activities at the Wyoming site are assumed to be equivalent to those described for the proposed Skull Valley site. As is true for the Skull Valley site, there should be no significant impacts to socioeconomic and community resources.

Considering impacts to all socioeconomic and community resources (e.g., population, housing, education, and transportation), the Wyoming site is not significantly different from the Skull Valley site, with the exception of the favorable benefits to the Skull Valley Band.

7.3.6 Cultural Resources

Equivalent cultural resources studies have not been completed for the Wyoming site, nor has consultation been initiated with the Wyoming SHPO or the Wind River Shoshone Tribe. Preliminary site file searches for the Wyoming site indicate no known archaeological sites on the property. The closest NRHP property is the Castle Gardens Petroglyph Site, located near Moneta, some 32 km (20 miles) to the southeast.

The Wyoming site falls within the traditional homelands of the Wind River Shoshone Tribe (Shimkin 1947; Fox 1976). Today, the eastern boundary of the Wind River Indian Reservation is located about 5 km (3 miles) west of the Wyoming Alternative site. Documentation of the presence or absence of traditional cultural places on or near this site has not been completed, although none are known to exist at this time.

Based on available information, the Skull Valley and Wyoming sites compare favorably in that each is projected to have small potential for impacts to significant archaeological and historical resources, as well as traditional cultural properties important to regional Indian tribes. This preliminary assessment is based on the known cultural resource information for the Skull Valley site and the general ecological setting of the Wyoming site (e.g., absence of important natural resources for subsistence, landform relief, and permanent water sources). The lack of archaeological, historical, and Native American resource identification and evaluation studies at the Wyoming site do not permit the inclusion of specific mitigation measures; nevertheless, the general approaches listed in Section 4.6.5 for the identification and preservation or documentation of such resources would be applicable at the Wyoming site as well.

7.3.7 Human Health Impacts

Members of the general public and facility workers would be exposed to radiation during routine operation of an ISFSI in Wyoming. This would result in these individuals receiving a radiation dose. Because the design of an ISFSI in Wyoming is assumed to be identical to the proposed PFSF in Skull Valley, the dose to a hypothetical individual at the boundary of the facility in Wyoming would be the same as in Skull Valley (see Section 4.7.2). Similarly, doses to facility workers would be the same for the proposed PFSF.

Doses to the resident nearest the Wyoming site would be greater than for the nearest resident in Skull Valley, because the Wyoming resident is located at a closer distance [approximately 1 km (0.6 mile) as compared to approximately 3.2 km (2 miles) in Skull Valley]. Data for the variation of dose rate and distance, as presented in PFS's safety analysis report (PFS/SAR 2000), indicates that annual dose to the resident nearest the Wyoming site would be approximately 0.02 mSv (2 mrem), which is well within the 0.25 mSv (25 mrem) criteria specified in 10 CFR 72.104 for maximum permissible annual whole body dose to any real individual. This dose represents about 0.7 percent of the natural background radiation dose in the United States (see Table 3.18), and is equivalent to an LCF risk of 1×10^{-6} or about one chance in a million of developing a fatal cancer from one year of operations. Because the nearest resident in Wyoming is closer than the nearest resident in Skull Valley, the radiological doses from accidents in Wyoming would be higher than those described in Section 4.7.2 for accidents in Skull Valley. However, the radiation doses would still be well within regulatory limits. The radiological impact to the nearest resident in Wyoming would therefore be small.

7.3.8 Other Impacts

7.3.8.1 Noise

Noise impacts from the construction and operation of an ISFSI at the Wyoming site would be expected to be similar to those of the proposed PFSF. Because a greater number of people live in closer proximity to the Wyoming site (as compared to the population around the Skull Valley site), noise may be more annoying at the Wyoming site, but any impacts should still be small.

7.3.8.2 Scenic Qualities

Construction and operation of the ISFSI at the Wyoming site would result in similar types of changes to the landscape as at the Skull Valley site (see Section 4.8.2). Facility construction and operation at

the Wyoming site would have the direct impact of changing the scenic quality of the area by introducing an industrial presence into a largely undeveloped landscape. Facility construction would create the short-term visual impacts of additional dust from the operation of heavy equipment on-site and additional vehicle traffic on local roads. Facility operation would create long-term visual impacts through the contrast of a large industrial facility with the surrounding landscape, the contrast of security lights with the surrounding darkness at night, and the generation of additional vehicle traffic on local roads.

The Wyoming site is surrounded by a larger residential population than the Skull Valley site, meaning that a larger number of residential viewers would be affected in Wyoming than in Skull Valley. Also, at the Wyoming site the facility would be located closer to the surrounding residential population than at the Skull Valley site. Thus, the facility would be more visible to surrounding residents in Wyoming than in Skull Valley. The Wyoming site, however, is not surrounded by elevated areas that are important for wilderness recreation such as the Deseret Peak Wilderness area in Utah. Thus, the facility would be less visible to recreationists in Wyoming than in Skull Valley.

7.3.8.3 Recreation

The recreational uses of and the recreation-related resources at the Wyoming site are unknown. However, because the Wyoming site is on privately-owned land, it would be expected that any impacts to recreational uses of the area would be acceptable to the landowner(s) if such a facility were to be built.

7.4 Impacts of Constructing and Operating SNF Transportation Facilities Near the Wyoming Site

The impacts of constructing and operating SNF transportation facilities in Skull Valley, Utah, are discussed in Chapter 5. The greatest difference between the Skull Valley site and the Wyoming site is the amount of land that would need to be cleared for the rail access corridors. In Skull Valley, approximately 314 ha (776 acres) would be cleared and graded, with approximately 63 ha (155 acres) being permanently cleared (i.e., for the life of the project). In comparison, the Wyoming site would only involve the clearing of approximately 10 ha (24 acres). In addition, the amounts of soil disturbance and construction material required for the 1.6-km (1-mile) rail line in Wyoming would be significantly less than for the 51-km (32-mile) rail line in Skull Valley.

Construction impacts for the rail line would be similar to those described in Section 7.3 for the SNF storage facility itself. Only in the areas of ecological resources and human health would the impacts for the rail access corridor differ substantively from what is presented in Section 7.3. These impacts are discussed below.

7.4.1 Ecological Resources

Impacts to ecological resources at the alternative site in Wyoming would be similar to those of the proposed action in Skull Valley.

Vegetation. The potential impacts on vegetation of constructing and operating transportation facilities for an ISFSI located near Shoshoni, Wyoming, would be small. They would be very similar to those associated with a facility located in Skull Valley, Utah as discussed in Section 5.4. However, a smaller amount of land would need to be cleared in Wyoming for transportation facilities. A new rail access corridor would be developed that would be less than 1.6 km (1 mile) long. Assuming that the width cleared for the rail corridor would be the same as in Skull Valley [i.e., 61 m (200 ft)], a maximum of about 10 ha (24 acres) would be cleared. Thus, based primarily on the need to clear less land for the project at the Wyoming site, the impact on vegetation would appear to be lower in Wyoming than for the proposed rail line in Skull Valley.

Wildlife. The greatest difference between the proposed action in Skull Valley and the Wyoming alternative is the amount of land cleared for the rail lines. In Skull Valley, approximately 314 ha (776 acres) would be cleared and graded, with approximately 63 ha (155 acres) being cleared for the life of the facility. The Wyoming site, in comparison, would involve the clearing of a maximum of only 10 ha (24 acres). This means that less wildlife habitat would be lost with the Wyoming alternative. This difference is unlikely to be significant, however. Predicted impacts for the Skull Valley proposal, with the application of appropriate mitigation, would be small.

Wetlands. Impact on wetlands from a new rail line located near Shoshoni, Wyoming, would be small, because the wetland in the area (see Section 7.3.4) would be avoided.

Perennial and ephemeral streams. Impact on streams from a new rail line located near Shoshoni, Wyoming, would be small, because no streams would be crossed by the rail route.

Threatened and endangered species and other species of special concern. Impact on plant and wildlife species of special concern would be small as none are known to be located in the area to be used for transportation facilities.

7.4.2 Human Health Impacts

The potential human health impacts resulting from construction and operation of transportation facilities at the Wyoming site, as well as the impacts (including possible transportation accidents) during the cross-country transportation of SNF to Wyoming, are discussed in this section. The human health impacts associated with construction and operation of an SNF storage facility at the Wyoming site are discussed in Section 7.3.7.

7.4.2.1 Non-Radiological Impacts

Potential worker injuries during construction and operations. Potential health impacts to workers during construction and operation of the new rail line in Wyoming would be similar to those described and analyzed in Section 5.7.2 for the Skull Valley site, with the exception that only about 1.6 km (1 mile) of new rail line would need to be constructed to access the Wyoming site. The potential non-radiological human health impacts were also determined to be small for the construction of transportation facilities in Skull Valley (see Section 5.7.2).

Direct impacts and risks of cross-country transportation of SNF. The non-radiological risks for shipments of SNF to and away from the Wyoming site would be similar to those for the proposed

PFSF in Skull Valley. The impacts of such shipments to and from Skull Valley are discussed in Section 5.7.2.

The direct, non-radiological impacts (including injuries or accidents along the transportation routes) would be approximately the same for an SNF storage facility in Wyoming as for the proposed PFSF in Skull Valley, because similar cross-country distances and numbers of shipments would be involved in each case. The major difference in overall direct impacts would be related to a different shipping distance for SNF leaving the Wyoming site and destined for a national repository. For the Wyoming site, it is assumed that these shipments would require an additional 1,260 km (780 miles) more than for the Skull Valley site. Thus, the total transportation distance associated with the entire lifetime set of operations (i.e., both receiving SNF at the Wyoming site and ultimately transferring 4,000 SNF canisters to the national repository) would be 22.4×10^6 railcar-km (14.0×10^6 railcar-miles) (see Section 5.7.2). A round-trip calculation is included in this analysis to provide an upper bound on the number of railcar-km. The round-trip distances for the lifetime set of operations would then be 44.8×10^6 railcar-km (28.0×10^6 railcar-miles).

Using the equations in Section 5.1.7.1, the direct, non-radiological transportation risks associated with the Wyoming site would be:

$$(4.26 \times 10^{-8} \text{ injuries/railcar-km}) \cdot (44.8 \times 10^6 \text{ railcar-km}) = 1.90 \text{ injuries, and} \\ (2.27 \times 10^{-8} \text{ fatalities/railcar-km}) \cdot (44.8 \times 10^6 \text{ railcar-km}) = 1.02 \text{ fatalities}$$

over the 40 year assumed lifetime of the proposed facility.

As was discussed in Section 5.7.2, Saricks and Kvitek (1994) noted that dedicated trains—such as would be used to transport SNF—spend much less time in rail yards than do regular trains, since dedicated trains do not undergo classification. Thus, it appears that the injuries and fatalities based on national averages are not as relevant for dedicated trains as they are for regular trains. Should the large portion of casualties which occur in rail yards be excluded from the national averages, the injury rate would decrease by a factor of almost 7 and the fatalities would decrease by a factor of about 36.

Indirect impacts and risks of cross-country transportation of SNF. The methods of assessing indirect impacts (including latent mortality from atmospheric emissions of locomotives) are discussed in Section 5.7.2. Such impacts associated with an SNF storage facility in Wyoming would be similar to those for the proposed PFSF in Skull Valley. Again, the difference would be primarily in the distance to a national repository for shipments leaving the proposed storage facility.

Using the equations in Section 5.7.2, the indirect, non-radiological transportation risk associated with the Wyoming site would be:

$$(1.3 \times 10^{-7} \text{ latent fatalities/train-km}) \cdot (44.8 \times 10^6 \text{ railcar-km}) \\ \div (4 \text{ railcars per train}) = 1.46 \text{ latent fatalities,}$$

if it is assumed that the total population along the rail routes is “urban.” This is a very small risk over the assumed 40-year lifetime of the proposed facility.

7.4.2.2 Radiological Impacts

The radiological human-health impacts of transporting SNF would include exposure of the public and transportation workers (e.g., the train crew) to ionizing radiation, thereby resulting in members of the general public and the workers receiving a radiation dose. The radiological impacts of spent fuel transportation presented in this section include estimates of dose from incident-free transportation of SNF and from potential SNF transportation accidents. As described below, these impacts would be expected to be small.

For cross-country transportation to the alternative ISFSI site in Wyoming, only shipments by rail are analyzed because of the size and weight of the shipping casks that are proposed for use by PFS. This DEIS also evaluates the impacts of transporting SNF from the Wyoming site to a permanent repository. A DEIS prepared by DOE (see DOE 1999) addresses in detail the national and regional transportation impacts of building and operating a permanent repository at Yucca Mountain, Nevada. Because Congress has directed DOE to study only Yucca Mountain for the proposed repository, this analysis uses an assumption that all SNF would be transported by rail from the Wyoming site to the Utah-Nevada border on its way to the permanent repository.

Summary of findings. The annual radiological impacts (as measured by doses and their corresponding LCF risk values) of transporting SNF to the alternative site in Wyoming are summarized in Tables 7.4 and 7.5. The impacts of transporting SNF to the Wyoming site are similar to the all-rail impacts of transporting SNF to the proposed PFSF in Skull Valley.

Table 7.4. Doses associated with SNF shipments from the Maine Yankee reactor to the alternative site in Wyoming

Incident-free dose [person-Sv (person-rem)]		Maximally exposed individual dose [Sv (rem)]	Accident dose to public [person-Sv (person-rem)]
Transportation crew	Public		
Annual—200 casks per year			
0.0113 (1.13)	0.0854 (8.54)	1.10×10^{-6} (1.10×10^{-4})	0.0365 (3.65)
20-year campaign—4,000 casks			
0.226 (22.6)	1.71 (171)	2.2×10^{-5} (2.2×10^{-3})	0.73 (73)

Table 7.5. Radiological risks associated with SNF shipments from the Maine Yankee reactor to the alternative site in Wyoming

Incident-free risk (LCF)		Maximally exposed individual risk (LCF)	Accident risk to public (LCF)
Transportation crew	Public		
Annual—200 casks per year			
4.52×10^{-4}	4.27×10^{-3}	5.50×10^{-8}	1.83×10^{-3}
20-year campaign—4,000 casks			
9.04×10^{-3}	8.54×10^{-2}	1.10×10^{-6}	3.65×10^{-2}

Tables 7.6 and 7.7 show the radiation doses and corresponding LCF risk values for shipments of SNF away from the Wyoming site to the Utah-Nevada border. While the doses along this route would be small for the Wyoming site, they would be higher than for similar shipments from the proposed PFSF in Skull Valley due to the shorter route length and lower population densities for the route from Skull Valley.

Table 7.6. Doses associated with SNF shipments from the alternative site in Wyoming to the Utah-Nevada border

Incident-free dose [person-Sv (person-rem)]		Maximally exposed individual dose [Sv (rem)]	Accident dose to public [person-Sv (person-rem)]
Transportation crew	Public		
Annual—200 casks per year			
0.004 (0.40)	0.0071 (0.71)	5.5×10^{-7} (5.50×10^{-5})	0.0042 (0.42)
20-year campaign—4,000 casks			
0.08 (8.00)	0.14 (14.2)	1.10×10^{-5} (1.10×10^{-3})	0.084 (8.40)

Table 7.7. Radiological risks associated with SNF shipments from the alternative site in Wyoming to the Utah-Nevada border

Incident-free risk (LCF)		Maximally exposed individual risk (LCF)	Accident risk to public (LCF)
Transportation crew	Public		
Annual—200 casks per year			
1.60×10^{-4}	3.55×10^{-4}	2.75×10^{-8}	2.10×10^{-4}
20-year campaign—4,000 casks			
3.20×10^{-3}	7.10×10^{-3}	5.50×10^{-7}	4.20×10^{-3}

Approach to the analysis. The approach to the analysis of transportation risks, including descriptions of the models used and the assumptions employed, is discussed in Section 5.7.2. This same analytical approach is used for SNF transportation involving the Wyoming site. As was done in Section 5.7.2 for the Skull Valley analyses, it was assumed that each shipment of SNF to the Wyoming site would travel from the Maine Yankee reactor (in the state of Maine) and would pass through many of the high-population northeast and midwest transportation corridors.

All casks and conditions for the incoming SNF shipments [e.g., 4 casks per train, 50 trains per year, 200 casks per year, external dose rate from the cask of 0.13 mSv/hr (13 mrem/hr) at 1 m (3 ft), etc.] were assumed to be the same as for the analysis in Section 5.7.2 for the proposed PFSF in Skull Valley.

The analyses were performed using RADTRAN4 with 1990 census information. Since these shipments would not be initiated until the first part of this century, the population exposures were

increased by 30 percent to account for the anticipated increase in the general population between the years 1990 and 2020 (see Section 5.7.2.3).

The Wyoming site is located approximately 1.6 km (1 mile) south of the existing Burlington Northern Santa Fe railway main line that runs through the central part of Wyoming. The route from Maine Yankee to the Wyoming site would be approximately 3,927 km (2,440 miles) long and would pass through major cities, such as Portland, ME, Buffalo, NY, and Chicago, IL. (This compares to 4,476 km (2,781 miles) from Maine Yankee to the proposed Skull Valley site.) The route is illustrated in Figure 7.3 and is described in detail in Appendix C of this DEIS. Due to the number of nuclear power reactors in the eastern United States, most SNF shipments would approach the Wyoming site from the east through central Nebraska and into Wyoming. The population densities and route fractions for the Maine Yankee-to-Wyoming route are shown in Table 7.8.

Shipments to a final repository. SNF stored at the Wyoming site would be shipped to a permanent repository. DOE has examined various options to receive rail shipments of SNF at Yucca Mountain ranging from the construction of a new rail line to the use of heavy-haul vehicles from intermodal facilities along existing rail routes in Nevada. Because DOE has not yet made a decision, this study only examines the shipment of SNF from the Wyoming site to the Utah-Nevada border.

The route is illustrated in Figure 7.4 and is discussed in detail in Appendix C of this DEIS. The route would pass through major cities, such as Cheyenne, WY, Ogden, UT, and Salt Lake City, UT.

Wyoming and regional impacts. This analysis also included the impacts of transporting SNF in the region (i.e., considered to be in and near Wyoming). To analyze the regional impacts, the INTERLINE routing model (see Appendix C) was used to examine possible rail access routes to the Wyoming site. Four such routes were identified. The distances of these routes ranged from 350 to 400 km (220 to 250 miles). The routes are illustrated in Figure 7.5.

In estimating the potential radiological impacts, the staff conservatively assumed that all 200 casks to be shipped annually, as well as the entire 40,000 MTU over the lifetime of the facility, would be shipped along each of the four possible routes. The radiological impacts from transportation of SNF along these routes are summarized in Table 7.9. For a detailed discussion of the regional analysis, see Appendix D.

From these results, it can be concluded that the overall radiological impact is small and would be similar to the radiological impact for transportation of SNF both to and away from Skull Valley.

7.5 Environmental Justice Considerations Near the Wyoming Site

The staff examined the geographic distribution of minority and low income populations within 80 km (50 miles) of an SNF storage facility at the Wyoming site. 1990 U.S. Census data was used to identify minority and low-income populations near the Wyoming site in the same manner as at the preferred site (Site A in Skull Valley).

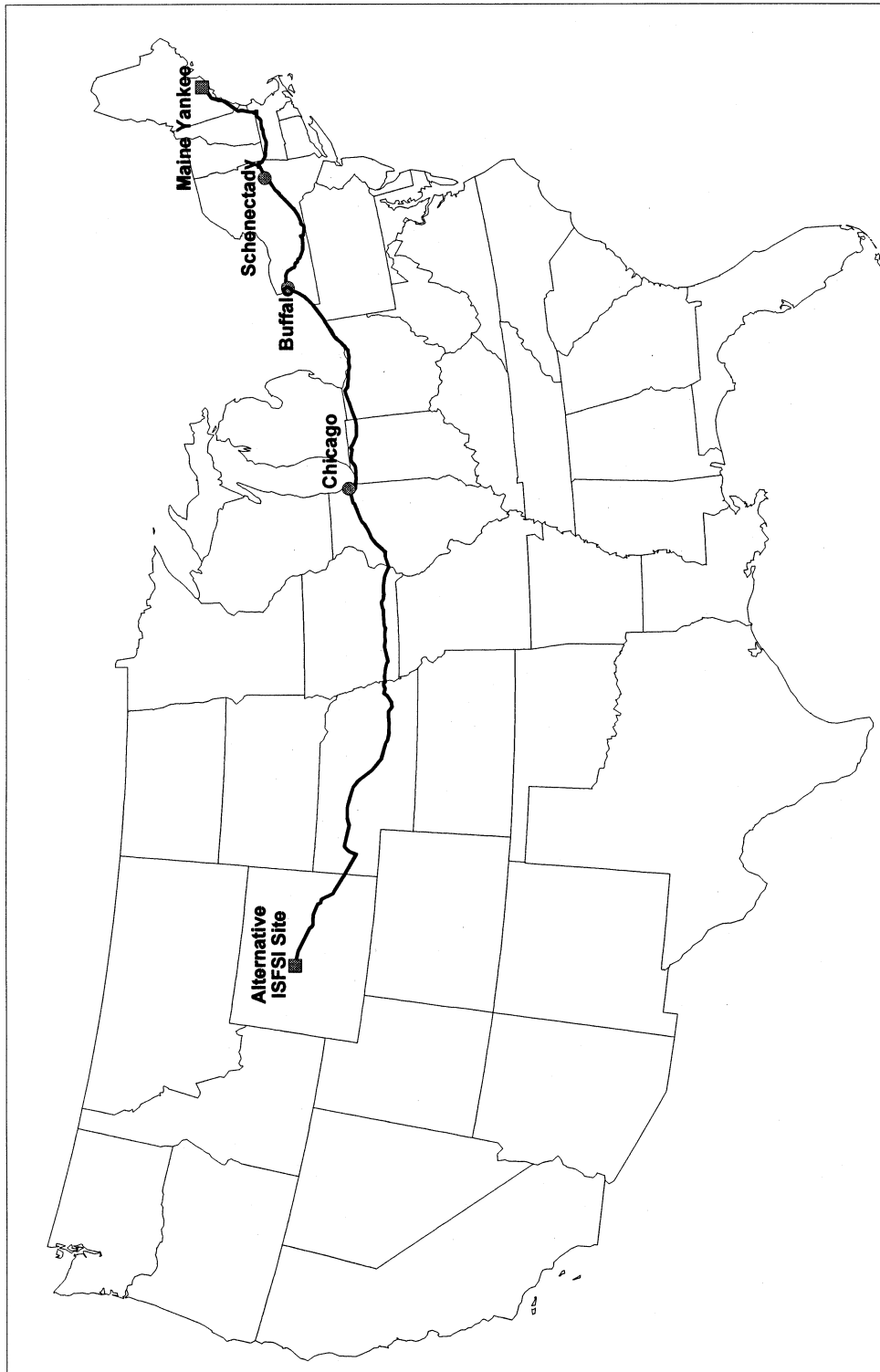


Figure 7.3. Potential cross-country rail route from the Maine Yankee nuclear power plant to Fremont County, Wyoming.

Table 7.8. Data characteristics for the route from the Maine Yankee reactor to the Wyoming site

Parameter	Data value
Route length	3,927 km (2,440 miles)
Urban fraction	0.04
Suburban fraction	0.25
Rural fraction	0.71
Urban population density	2,383 people/km ² (6,170 people/mile ²)
Suburban population density	333 people/km ² (862 people/mile ²)
Rural population density	10 people/km ² (26 people/mile ²)

7.5.1 Demographics

7.5.1.1 Minority populations

The significant minority populations near the proposed Wyoming alternative site are Native Americans resident on and near the Wind River Reservation. This is illustrated in Figure 7.6, which highlights the geographic distribution of Census block groups meeting the criteria for minority populations in the 1990 U.S. Census within 80 km (50 miles) of the Wyoming site.

Minority populations near the Wyoming site were identified using the same criteria applied in Section 6.2.1 for the Skull Valley site (i.e., where the minority population exceeds 50 percent or where the percentage of the minority population of the impact assessment area is at least 20 percentage points greater than the minority population percentage in the geographic area of study). As in the environmental justice analysis performed for the preferred site in Skull Valley, the impact assessment area for the Wyoming site also was expanded to 80 km (50 miles) to examine transportation routes into the facility and the percentage criterion. The percentage criterion was left at 20 percentage points; however, the staff examined a 10 percentage point difference to see if additional relatively small pockets of low income and minority residences could be identified. Table 7.10 shows these data. Similar to the outcome for the Skull Valley analysis, relaxing the criteria would have expanded the number of block groups counted as minority block groups from 9 to 18, but would not have significantly changed the picture of their location. These additional block groups tend to be adjacent to those already identified using the 20-percentage point criteria. One minority block group is located immediately south of the Wyoming site (Tract 9825, Block Group 3) (see Figure 7.6).

Native Americans reside principally on the northern and southern thirds of the Wind River Reservation, several miles to the west of the Wyoming site. Although the largest minority group in Fremont County is Native American, the minority block group nearest to the proposed PFSF site is an Hispanic community (Tract 9825, Block Group 3). This block group is approximately 1.6 km (1 mile) from the site and stretches from immediately south of the site to the east and southeast. No other significant minority populations were identified in any census block group either close to the

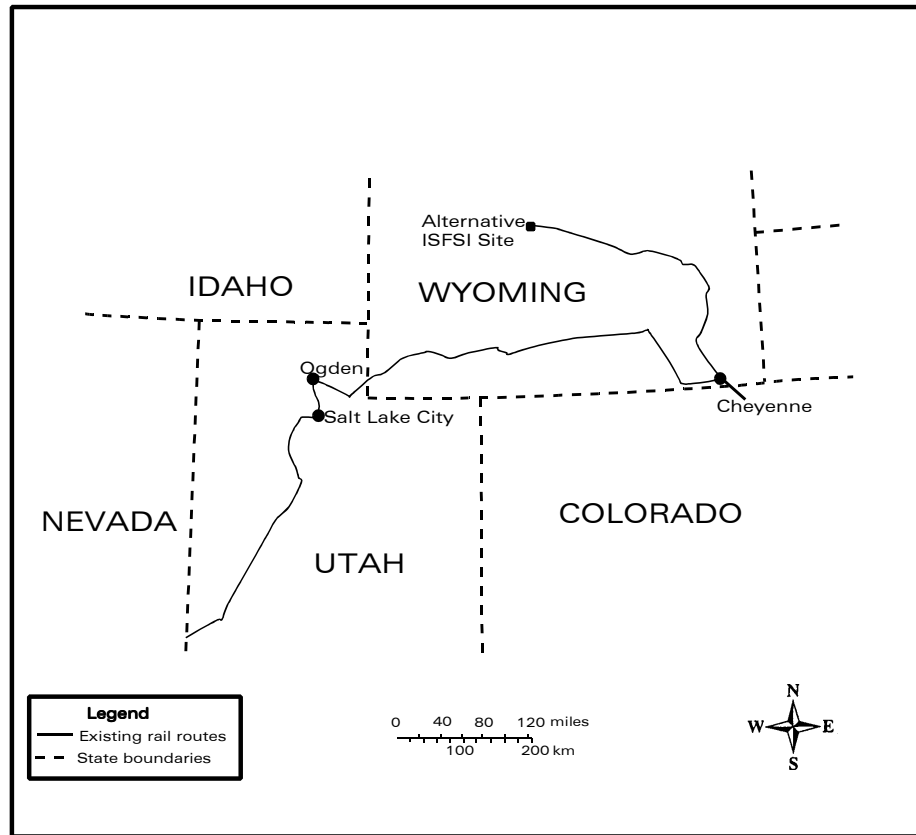


Figure 7.4. Potential rail route from the Fremont County, Wyoming, site to the Utah-Nevada border.

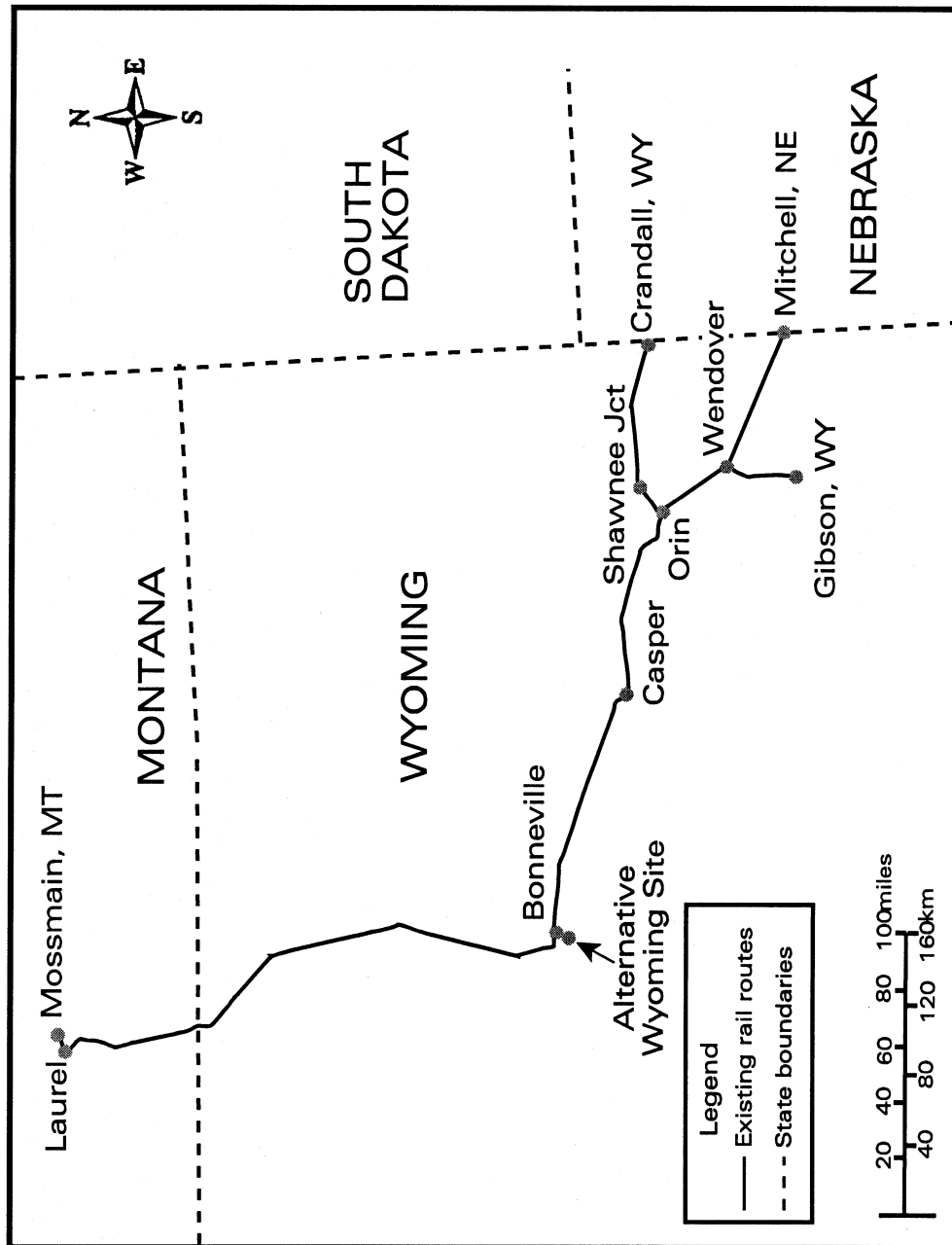


Figure 7.5. Potential rail routes for shipping spent nuclear fuel to Fremont County, Wyoming.

Table 7.9. Summary of the cumulative annual and 20-year campaign risks (as measured by latent cancer fatalities) for the shipment of spent nuclear fuel by rail to the alternative Wyoming ISFSI site

To the Wyoming site from:	Annual risks (LCFs) from 1 year rail shipments				Risks (LCFs) from 20 years of rail shipments			
	Incident-free risk		Accident risk		Incident-free risk		Accident risk	
	Crew	Public	Crew	Public	Crew	Public	Crew	Public
Crandall, WY	2.30×10^{-4}	7.30×10^{-5}	3.60×10^{-5}	3.60×10^{-5}	4.61×10^{-3}	1.46×10^{-3}	7.20×10^{-4}	7.20×10^{-4}
Gibson, WY	2.31×10^{-4}	7.65×10^{-5}	3.69×10^{-5}	3.69×10^{-5}	4.62×10^{-3}	1.53×10^{-3}	7.38×10^{-4}	7.38×10^{-4}
Mitchell, NE	2.34×10^{-4}	7.95×10^{-5}	3.76×10^{-5}	3.76×10^{-5}	4.67×10^{-3}	1.59×10^{-3}	7.52×10^{-4}	7.52×10^{-4}
Mossmain, MT	2.31×10^{-4}	4.42×10^{-5}	1.28×10^{-5}	1.28×10^{-5}	4.62×10^{-3}	8.84×10^{-4}	2.56×10^{-4}	2.56×10^{-4}

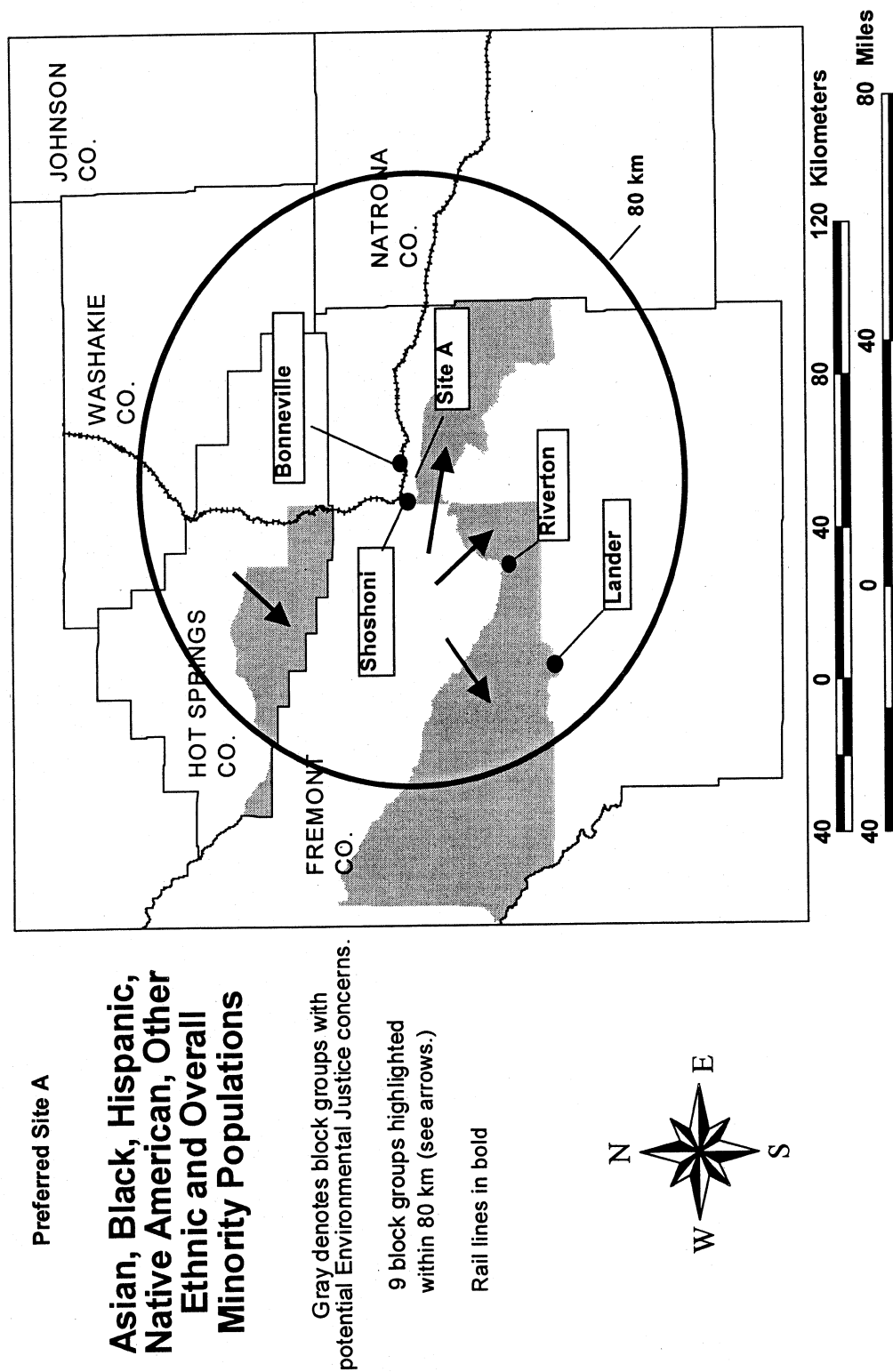


Figure 7.6. Geographic distribution of minority census block groups within 80 km (50 miles) of the alternative site in Fremont County, Wyoming.

Table 7.10. Minority and low-income block groups within 80 km (50 miles) of the alternative site in Fremont County, Wyoming
(Boldface entries = 20 percent criterion; Italicized entries = 10 percent criterion)

County and tract	Block group	Persons	Below poverty level (percent)	Total whites (percent)	Black (percent)	Native American (percent)	Asian and Pacific Islander (percent)	Other (percent)	Hispanic (all races) (percent)	Minorities (racial minorities plus white hispanics) (percent)
State of Wyoming		453,588	11.9	94.2	0.7	2.2	0.6	2.3	5.5	8.9
threshold for environmental justice concern		—	31.9	—	20.7	22.2	20.6	22.3	25.5	28.9
Washakie										
9902	5	18		83.3	0.0	16.7	0.0	0.0	16.7	
Hot Springs										
9877	4	116	16.0	74.1	0.0	25.0	0.0	0.9	1.7	29.1
9877	5	24	0.0	79.2	0.0	0.0	0.0	20.8	20.8	20.8
Fremont										
9825	1	143	30.5	95.1	0.0	0.0	0.0	4.9	6.3	5.6
9825	3	17	0.0	64.7	0.0	0.0	0.0	35.3	35.3	35.3
9826	2	30	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
9828	1	617	30.0	83.5	0.2	14.3	0.2	1.9	3.4	18.2
9828	2	362	32.1	80.9	0.0	16.9	0.6	1.7	4.4	20.4
9829	2	81	40.8	98.8	0.0	0.0	0.0	1.2	1.2	1.2
9831	4	369	15.1	79.7	0.0	19.5	0.0	0.8	1.9	23.1
9832	1	604	76.4	24.0	0.0	74.2	0.0	1.8	4.3	76.0
9832	2	1,135	44.6	15.8	0.2	82.9	0.0	1.1	5.6	84.2
9832	3	669	24.7	44.4	0.0	53.7	0.1	1.8	3.4	55.6
9832	4	1,632	42.9	5.3	0.3	93.9	0.0	0.5	3.0	94.7
9832	5	1,199	39.3	12.1	0.0	87.5	0.1	0.3	6.1	89.7
9832	6	204	56.3	21.1	0.5	73.5	0.0	4.9	10.8	78.9
9832	7	269	23.7	66.2	0.0	33.5	0.4	0.0	1.9	33.8
9833	1	626	23.6	90.1	1.6	5.4	0.3	2.6	3.7	9.9
9833	4	692	34.3	79.6	0.3	17.3	0.0	2.7	5.8	23.9
9833	5	603	19.8	84.2	0.3	11.1	0.2	4.1	14.1	25.2
9833	6	673	39.1	81.9	0.0	10.8	0.3	7.0	13.2	18.1
9834	3	292	31.3	96.6	0.0	2.7	0.7	0.0	6.5	11.0
9834	4	240	49.6	85.0	0.0	12.5	0.0	2.5	3.8	17.7
9834	5	613	22.1	84.5	0.0	10.0	0.3	5.2	10.6	20.0

Wyoming site or along the proposed transportation corridors into the site. This indicates that other minority populations are either well-mixed into the majority population, or that other minority populations are too small to be captured in the census data. The Native Americans on the northern and southern thirds of the Wind River Reservation and the Hispanic community near the Wyoming site represent the minority populations that have the potential to experience high and adverse impacts and, therefore, warrant consideration in an environmental justice evaluation.

7.5.1.2 Low-Income populations

Figure 7.7 shows the distribution of low-income populations for the impact assessment area out to 80 km (50 miles) from the Wyoming site. These are disproportionately the residents of the Wind River Reservation. Both within and beyond 80 km (50 miles), the principal low-income areas appear

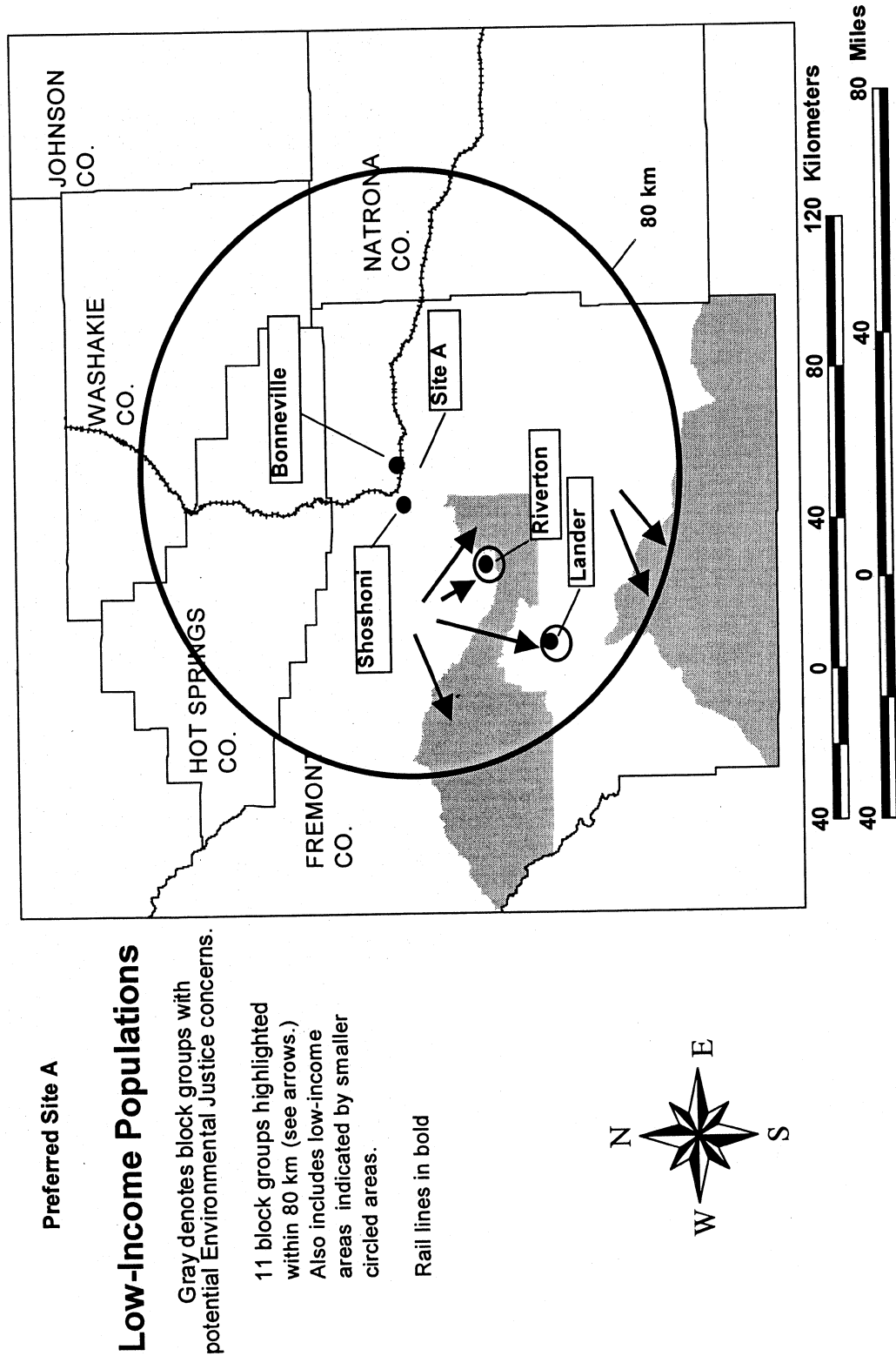


Figure 7.7. Geographic distribution of low-income census block groups within 80 km (50 miles) of the alternative site in Fremont County, Wyoming.

to correspond mainly with the local Native American communities. No low-income community is within 6 km (4 miles) of the Wyoming site.

7.5.2 Assessment of Impacts

Because the impacts from the construction and operation of the proposed ISFSI at the Wyoming site would be similar to those incurred at the Skull Valley site, any negative environmental justice impacts of the Wyoming alternative are expected to be similar in scope and type to those at the Skull Valley site with the following principal exceptions. First, because the Wyoming site is on private land, the Native Americans on the Wind River Reservation will not have the opportunity to benefit from lease payments, although it is possible that they could benefit from employment at the site. Second, while it is not clear if Native Americans or other minority and low-income groups use the area in the vicinity of the Wyoming site for subsistence activities, there is very little use of the area near the privately-owned Wyoming site for cultural or subsistence purposes. The impact on cultural or subsistence activity of the Wyoming alternative likely would be small. Thus, no disproportionately high and adverse impact would occur to minority and low-income communities. Considering the positive and negative impacts from the proposed PFSF, the Wyoming alternative is not significantly different from the preferred site in Skull Valley from an environmental justice perspective.

7.6 Comparison of the Skull Valley, Utah, and Wyoming Sites

Table 7.11 compares the potential impacts of constructing and operating an SNF storage facility (and its associated transportation facilities) in Wyoming with those of such a facility in Skull Valley, Utah. Note that NRC has no authority to decide the location of the proposed PFSF; NRC's decision, as described above, is either to grant or deny PFS's license application for the Skull Valley location. The Wyoming site is evaluated in this DEIS for the purpose of comparing potential impacts against the proposed PFSF in Skull Valley. Because a detailed design for an ISFSI in Wyoming does not exist, and because the Wyoming site has not been studied in as great detail as the Skull Valley site, an exact one-to-one comparison of potential impacts is not possible for each resource category. The conclusions regarding the evaluation of the Skull Valley site versus the Wyoming site are therefore made from the perspective of determining whether the Wyoming site is obviously superior to the Skull Valley site for the purpose of constructing and operating the proposed PFSF.

With two possible exceptions (as discussed below), the potential impacts for an SNF storage facility at the site in Fremont County, Wyoming, would be similar to those for the proposed PFSF in Skull Valley. The exceptions include: impacts associated with the local transportation options and impacts to the Skull Valley Band. Each of these exceptions is discussed below.

Construction and operation of an ISFSI at the Wyoming site would cause fewer impacts than the Skull Valley site in regard to land use and the required amounts of construction materials related to the construction of a new rail access corridor. Because of the greater distance from existing rail service in Skull Valley, significantly larger amounts of land, which is public land administered by the BLM, would be needed for a new rail transportation corridor in Skull Valley than for the Wyoming alternative (which lies entirely on privately-owned land). The Wyoming site would require only about 1.6 km (1 mile) of new rail line, compared to 51 km (32 miles) in Skull Valley. The other impacts of

Table 7.11. Summary and comparison of potential environmental impacts between an SNF storage facility at the Skull Valley, Utah, site and at the Fremont County, Wyoming site

Site A in Skull Valley with a new rail line (i.e., the proposed action)	Alternative site in Wyoming ^a
Geology, Soils, and Mineral Resources	
SMALL. Impacts to soils and economic geologic resources could occur from construction and operation of the proposed PFSF and the rail line. A small percentage of the soils in the valley would be permanently lost in the soil/cement mixture. Excess soils would not be generated. Aggregate materials used for construction are readily available locally and would be recoverable in decommissioning. Underlying mineral resources would be unavailable during operation.	Like the proposed site (Site A in Skull Valley), the impacts to soils and economic geologic resources will occur. Because a much shorter rail line would be required at the Wyoming site, soils disturbance and geologic resource commitments would be less than at the proposed Skull Valley site. Impacts from the unavailability of mineral resources beneath the site would be the same as for the proposed site.
Surface Water	
SMALL. Some modification of surface drainage patterns could occur; however, there would be no adverse effects during normal weather conditions.	There would be less interaction of the site footprint and access routes with surface runoff channels at the Wyoming site as compared to the Skull Valley site.
Flooding	
SMALL TO MODERATE. Severe flooding conditions, if they occur during construction of the proposed PFSF, could cause erosion of disturbed soil and unvegetated embankments and would create downstream siltation. Potential impacts to the rail line under severe flooding events would be similar to those described above for the PFSF.	Potentially smaller impacts from watershed-scale flooding than at the Skull Valley site.
Water Use	
SMALL. Most water required for construction would be purchased from commercial suppliers. On-site groundwater use would involve small quantities.	Less water would be required for construction at the Wyoming site because of a much shorter rail access corridor than in Skull Valley.
Groundwater	
SMALL. Little to no potential for impacts to other groundwater users or to groundwater quality.	Residential wells are known to exist within 1.6 km (1 mile) of the Wyoming site. Groundwater quantity may be affected.
Air Quality	
SMALL TO MODERATE. Large amounts of fugitive dust from earth disturbance would occur during construction of the storage facility, and of the rail line where it runs close to Interstate 80. Air quality impacts would be small for the storage facility, and moderate (similar to a large road construction project) for the rail line construction near Interstate 80, where small effects might be experienced by large numbers of people. Air quality impacts during operation from up to two locomotives, vehicles, and a backup generator would be small.	Impacts at the Wyoming site are likely to be greater than any at the Skull Valley site due to the proximity of construction areas to the nearest residence and nearby population centers.

Table 7.11 (continued)

Site A in Skull Valley with a new rail line (i.e., the proposed action)	Alternative site in Wyoming ^a
Terrestrial Ecology	
<p>Vegetation. SMALL. Clearing of approximately 408 ha (1,008 acres) of land for construction of the proposed facility and associated rail line would result in loss of existing degraded desert shrub/saltbush vegetation dominated by non-native cheatgrass. About 71 percent of this area would be replanted with native species or crested wheatgrass.</p>	<p>The impacts to vegetation for a facility in Wyoming would be similar to those for a facility in Skull Valley. The amount of vegetation disturbed by clearing would be less than for the proposed action because the rail line would be shorter.</p>
<p>Wildlife. SMALL. Construction of the proposed facility and rail line would disturb 408 ha (1,008 acres) of wildlife habitat, but 63 percent of this area would be re-planted to native species and crested wheatgrass which may provide improved habitat for some species. Fences around the proposed facility and the raised rail bed would be expected to alter movement patterns of larger animals, but such impacts should be small if BLM recommended mitigation to provide crossings of the rail line are implemented. Impacts of operation of the proposed facility could result in radiation exposure to some species.</p>	<p>The impacts to wildlife for a facility in Wyoming would be similar to those for a facility in Skull Valley. Wildlife species that are present on the Wyoming site are similar to those at Skull Valley and would be affected in similar ways. Less wildlife habitat would be affected because of the shorter rail line required for the Wyoming site.</p>
<p>Wetlands. SMALL. No impacts to wetlands from construction of the proposed facility are anticipated because there are no wetlands on or near the preferred site or in the vicinity of the rail line and siding. A potential small impact to wetlands around Horseshoe Springs could result from increased recreational use.</p>	<p>The impacts to wetlands for a facility in Wyoming would be similar to those for a facility in Skull Valley. One wetland is known to occur on the Wyoming site, but it would be avoided if the project were to be located there.</p>
<p>Perennial and ephemeral streams. SMALL. No impacts to streams are expected to occur on the proposed site because there are no streams present. Because the proposed rail corridor would cross 32 streams with ephemeral flows, it is possible, depending on the time of year that construction occurs, that disturbed soils could create small short-term increases in the turbidity of any water in such streams. Such impacts are expected to be small.</p>	<p>The impacts to perennial and ephemeral streams for a facility in Wyoming would be similar to, those for a facility in Skull Valley. Two ephemeral streams occur near the Wyoming site and two or three dry washes are within 1.6 km (1 mile) of the site.</p>
<p>Threatened and endangered species. SMALL. No Federally or State-listed threatened or endangered plant species are known to occur on the proposed site or rail line. Federally and State-listed raptors and the listed loggerhead shrike are potentially present in Skull Valley. Pohl's milkvetch, a State plant species of concern, is potentially present near the site. PFS intends to survey the site again to determine whether these species are present and take measures as necessary to avoid or minimize any impact before construction was initiated. Habitat for the BLM-listed kit fox is present along the Skunk Ridge rail line. Since the amount of habitat is a very low percentage of the available habitat in Skull Valley, however, impacts to this fox are predicted to be small.</p>	<p>The impacts to threatened and endangered species and State species of concern for a facility in Wyoming would be similar to those for a facility in Skull Valley. Owl Creek miner's candle, a plant species which has a declining population, occurs in the general area of the Wyoming site, and the ferruginous hawk, a State-listed species in Wyoming, is reported to use the site.</p>

Table 7.11 (continued)

Site A in Skull Valley with a new rail line (i.e., the proposed action)	Alternative site in Wyoming ^a	
Socioeconomics and Community Resources		1
Population. SMALL. The total increase in population amounts to approximately 0.6 percent of Tooele County's 1996 population during construction and less than that during operations.	The Wyoming site is located in a remote, sparsely populated area, and the impacts to population of constructing and operating a facility at the Wyoming site are expected to be quantitatively similar to those at the remote Skull Valley site.	2 3 4 5
Housing. SMALL. The total increase in housing requirements amounts to approximately 26 percent of vacant housing units for sale or rent in 1990 for Tooele County during construction and approximately one-half that proportion during operations.	The Wyoming site is located in a remote, sparsely populated area, and the impacts to housing of constructing and operating a facility at the Wyoming site are expected to be quantitatively similar to those at the remote Skull Valley site.	6 7 8 9 10
Education. SMALL. The total increase in school-age children amounts to approximately 0.5 percent of the enrollment in 1997 for Tooele County during construction and somewhat less than that during operations.	The Wyoming site is located in a remote, sparsely populated area, and the impacts to education of constructing and operating a facility at the Wyoming site are expected to be quantitatively similar to those at the remote Skull Valley site.	11 12 13 14
Utilities. SMALL. There may be some improvement to electrical service if upgrades are required for the proposed facility. The small number of in-moving workers would likely live in existing housing during construction and operations that would not require additional utility hookups.	The Wyoming site is located in a remote, sparsely populated area, and the impacts to utilities of constructing and operating a facility at the Wyoming site are expected to be similar to those at the remote Skull Valley site.	15 16 17 18 19
Solid and sanitary waste. SMALL. The actual quantities of solid wastes expected to be generated are small during both construction and operation of the proposed site and would be shipped to licensed landfills or to permitted low-level waste facilities, as appropriate. Spoils resulting from construction of the proposed facility and the proposed rail line would be reapplied for grading purposes, and vegetative wastes along the proposed rail line would be shredded and scattered in place.	The Wyoming site is located in a remote, sparsely populated area, and the impacts to solid wastes of constructing and operating a facility at the Wyoming site are expected to be similar to those at the remote Skull Valley site.	20 21 22 23 24 25 26 27 28
Transportation and traffic. MODERATE TO LARGE. The period of greatest traffic impact would occur during the first 6–8 weeks of constructing the proposed facility, with a 172 percent increase in the use of Skull Valley Road for the movement of construction materials and workers resulting in delays along it. Impacts resulting from construction of the proposed rail siding and rail line would be minimal (accounting for only a 4.5 percent increase in traffic along Interstate 80) and would be spatially separate from impacts along Skull Valley Road. Impacts during operation of the proposed facility and use of the rail line for the movement of SNF would be substantially less than during construction.	The Wyoming site is located in a remote, sparsely populated area. The impacts to transportation of constructing and operating a facility at the Wyoming site are expected to be less than those at the remote Skull Valley site because of the Wyoming site's closer proximity to the railroad mainline.	29 30 31 32 33 34 35 36 37 38 39 40

Table 7.11 (continued)

Site A in Skull Valley with a new rail line (i.e., the proposed action)	Alternative site in Wyoming ^a	
<p>Economic structure. SMALL TO MODERATE (but beneficial). Constructing the proposed facility and the proposed rail line would directly result in the creation of approximately 255 jobs during the peak of construction and approximately 43 during operation. Construction and operation of the proposed facility would result in increased business for the Pony Express Convenience Store on the Reservation and for other businesses and suppliers in the area. There should be a large benefit to the Skull Valley Band in the form of lease payments for the duration of the proposed facility's operation.</p>	<p>The Wyoming site is located in a remote, sparsely populated area, and the impacts to economic structure of constructing and operating a facility at the Wyoming site are expected to be similar to those at the remote Skull Valley site except for those on the Skull Valley Band. Because this site is not on tribal trust land, the local Native American community would not benefit from lease payments, although members might benefit from employment because of the facility.</p>	1 2 3 4 5 6 7 8 9 10 11
<p>Economic benefits of the proposed project include state and county tax payments, local payroll, and other expenditures. Tax payments to the State of Utah are estimated to be \$53.5 million, while tax payments to Tooele County are estimated to be \$92 million over the life of the project. Local payroll during operation of the proposed PFSF is estimated to be \$81 million. Other local expenditures, including operations support and utilities, are estimated to be \$70 million. The construction of steel liners for the storage casks could be accomplished locally or in Salt Lake City and could add an additional \$747 million to anticipated local expenditures.</p>	<p>Economic benefits similar to those identified for a facility in Skull Valley would be expected to accrue to the state and local governments with jurisdiction over the Wyoming site.</p>	12 13 14 15 16 17 18 19 20 21 22 23
Land Use		24
<p>SMALL TO MODERATE. Impacts to land use for construction of the proposed facility would be expected to be quantitatively small (since a small proportion of the total land of the Reservation and an even smaller proportion of land within Skull Valley would be altered), even if the change would be qualitatively different. Construction of the proposed rail line, however, could result in reduced availability of grazing resources, including access to livestock watering resources, during both construction and more particularly during operation.</p>	<p>The Wyoming site is located in a remote, sparsely populated area. The impacts to land use of constructing and operating a facility at the Wyoming site are expected to be less than those at the remote Skull Valley site because of fewer land requirements for transporting SNF from the railroad mainline to a storage facility.</p>	25 26 27 28 29 30 31 32 33 34
Cultural Resources		35
<p>SMALL TO MODERATE. Intensive cultural resource source field studies have been conducted at Sites A and B on the Reservation. Based on that information, potential impacts to archaeological and historical resources from construction and operation of the facility are considered to be small.</p> <p>Construction of the new rail line from Skunk Ridge would directly impact a small segment of the National Register-eligible historic Hastings Cutoff Trail, and may impact another site (a rock alignment and cairn) that has not been fully evaluated. Construction activities for the rail line is considered to have a moderate impact on cultural resources. Operation of the rail line will have a small impact.</p>	<p>Although equivalent archaeological, historic, and Native American cultural resource studies have not been conducted at the Wyoming site, it is believed, based on the site file and literature reviews, that impacts to cultural resources would be at least similar to those for a facility in Skull Valley. The fact that a lengthy rail access is not required generally reduces the potential for adverse impacts to cultural resources.</p>	36 37 38 39 40 41 42 43 44 45 46 47 48 49

Table 7.11 (continued)

Site A in Skull Valley with a new rail line (i.e., the proposed action)	Alternative site in Wyoming ^a
No traditional cultural properties important to Indian Tribes or culturally important natural resources have been documented at Sites A and B, or along the proposed rail corridor. Consequently, construction and operation of the proposed PFSF is considered to have a small potential for impacting such resources or cultural values.	
Human Health (Excluding SNF Transportation Impacts)	
Non-radiological impacts to workers. SMALL. Occupational accidents during construction and operation of the proposed PFSF and rail line would be expected to result in no fatal injuries and possibly 8 nonfatal injuries during the 40-year life of the facility.	The impacts to workers for a facility in Wyoming would be similar to those for a facility in Skull Valley. The primary differences would be related to a shorter length of rail line being constructed in Wyoming.
Radiological doses to members of the public. SMALL. The estimated annual dose to a hypothetical individual at the boundary of the storage area would be no more than 0.056 mSv (5.6 mrem). This is about 2 percent of the dose from natural background radiation in the United States and is well within the 0.25 mSv/yr (25 mrem/yr) limit established by NRC regulations. The dose to the nearest resident would be no more than 3.4×10^{-4} mSv/yr (0.034 mrem/yr).	The impacts to the public for a facility in Wyoming would be similar to those for a facility in Skull Valley. However, there is a larger population near the Wyoming site and the nearest residence is closer than in Skull Valley. The dose to the nearest resident would be about 2 mrem/yr, which is well within NRC regulatory limits.
Radiological doses to workers. SMALL. The average individual dose to workers engaged in SNF transfer operations at the proposed PFSF is estimated as 0.0445 Sv/yr (4.45 rem/yr) which is within the NRC's regulatory limit of 5 rem/yr for workers.	The impacts to workers for a facility in Wyoming would be similar to those for a facility in Skull Valley.
Human Health from Transportation of SNF	
Incident-free transportation. SMALL. The potential impacts for moving SNF by rail to the proposed PFSF are estimated to be no greater than the equivalent of an LCF risk of 0.0918 among members of the public along the rail routes for the 20-year campaign to fill the facility. The train crew would receive a dose no greater than the equivalent of an LCF risk of 0.00976.	The annual impacts of shipping SNF by rail to the Wyoming site are estimated to be no greater than the equivalent of an LCF risk of 0.0854 for members of the public along the rail routes for the 20-year campaign to fill the facility. The train crew would receive an annual dose no greater than the equivalent of an LCF risk of 0.00904.
Non-radiological accidents during transportation. SMALL. The statistical number of vehicle-related accidents associated with the shipment of SNF by rail to Skull Valley is estimated to result in 0.65 injuries and 0.33 fatalities over the 40-year lifetime of the proposed facility.	Impacts from vehicle-related accidents during shipments to the Wyoming site would be approximately the same as for shipments to Skull Valley.
Radiological accidents during transportation. SMALL. The potential impacts of accidents during the shipment of SNF by rail to the proposed PFSF are estimated to be no greater than the equivalent of an LCF risk of 0.0423 among members of the public along the rail routes for the 20-year campaign to fill the facility.	The potential impacts of accidents during the shipment of SNF by rail to the Wyoming site are estimated to be no greater than the equivalent of an LCF risk of 0.0365 among members of the public along the rail routes for the 20-year campaign to fill the facility.

Table 7.11 (continued)

Site A in Skull Valley with a new rail line (i.e., the proposed action)	Alternative site in Wyoming ^a
Environmental Justice	
SMALL. The largest negative effect would be the pre-emption of the 120 ha (295 acres) of land to be cleared for the life of the proposed PFSF and rail corridor, which may have a slight effect on traditional land uses in the BLM lands to the west of Site A. Members of the Skull Valley Band would benefit from the proposed PFSF lease payments and employment. There are no disproportionately high and adverse impacts on low income or minority populations.	The potential impacts for a facility in Wyoming would be similar to, but less than, those for a facility in Skull Valley, because the Wyoming site does not require a lengthy rail corridor. Because the Wyoming site is not on tribal trust land, the local Native American community would not benefit from lease payments, although members might benefit from employment at the facility. There would be no disproportionately high and adverse impacts on low income or minority populations near the Wyoming site.
Noise	
SMALL. Noise from large-scale construction would be discernable, although probably not annoying, at outdoor locations near the nearest resident. Construction of a rail line near Interstate 80 would not add appreciably to existing noise levels within passing vehicles. Noise from operation would arise primarily from locomotives transporting casks. These locomotives would be moving slowly and would not be hauling boxcars; noise would not be much less than for a long train. In most cases, this noise is not expected to be perceptible at the nearest residence.	There are no discernable differences between noise impacts at the Wyoming sites and the Skull Valley sites. Noise from construction and operation would occur closer to more people at the Wyoming site, but background noise is already higher there due the greater amount of human activity.
Scenic Qualities	
MODERATE. Construction and operation would have the direct impact of changing the scenic quality of Skull Valley by introducing an industrial presence into a largely undeveloped landscape. This change would represent small to moderate impacts to recreational viewers, residents of Skull Valley, and motorists traveling Skull Valley Road and Interstate 80.	Visual impacts for a facility in Wyoming would be similar to those of a facility in Skull Valley, while the visual impacts of transportation facilities would be less for the Wyoming site than for the lengthy rail corridor in Skull Valley.
Recreation	
SMALL. There may be some delays or inconvenience to users wishing access to recreational resources and opportunities, particularly during construction, when access to these resources in Skull Valley would be adversely affected by the movement of construction materials and workers on Skull Valley Road. Access to resources west of the proposed rail line would be affected by rail line construction. Impacts to recreational resources and opportunities should be smaller during operations.	The Wyoming site is located in a remote, sparsely populated area, and the impacts to recreation of constructing and operating a facility at the Wyoming site are expected to be similar to those at the remote Skull Valley site.

^aThe Wyoming site has been compared to the proposed site (i.e., Site A in Skull Valley) only to determine if it is obviously superior to the Skull Valley site selected by PFS.

constructing a new rail line in Skull Valley would also be absent for an SNF storage facility at the Wyoming site. These impacts include the use of railbed ballast and aggregate, as well as the increased road use of vehicles transporting these construction materials.

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If the proposed PFSF were not constructed on the Reservation, then its positive economic benefits would not accrue to the Skull Valley Band. The Tribe would be free to pursue other uses for their land, but would lose opportunities for employment, as well as the financial gain from the proposed lease.

In regard to all other potentially affected resources, neither the Skull Valley site nor the Wyoming site appears to be appreciably different. Therefore, based on the above, the NRC staff concludes that the construction and operation of an ISFSI at the Wyoming site is not an obviously superior alternative to the proposed action.